



# United States Department of the Interior



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October 10, 2018

To: Interested Parties

From: Scott Voss, Supervisory Fish Biologist, Red Bluff Fish and Wildlife Office

Subject: Biweekly report (September 24, 2018 - October 7, 2018)

Please find attached preliminary daily estimates of passage, 90% confidence intervals, and fork length ranges of unmarked juvenile salmonids sampled at Red Bluff Diversion Dam for the period September 24, 2018 through October 7, 2018. Race designation was assigned using length-at-date criteria.

This report also contains graphical displays of salmonid passage dating back to 2011 for comparison.

Please note that data contained in these reports is subject to revision as this data is preliminary and undergoing QA/QC procedures.

If you have any questions, please feel free to contact me at (530) 527-3043 ext 243.

Table 1.— Preliminary estimates of passage by brood-year (BY) and run for unmarked juvenile Chinook salmon and steelhead trout captured by rotary-screw traps at Red Bluff Diversion Dam (RK391), Sacramento River, CA, for the dates listed below. Results include estimated passage, peak river discharge volume, water temperature, turbidity, and fork length (mm) range in parentheses. A dash (-) indicates that sampling was not conducted on that date.

| Date  | Discharge volume (cfs) <sup>1</sup> | Water temperature (°C) | Water turbidity (NTU) | Estimated passage |                          |                   |                  |               |
|---|-------------------------------------|------------------------|-----------------------|-------------------|--------------------------|-------------------|------------------|---------------|
|   |                                     |                        |                       | BY18 Winter       | BY17 Spring <sup>2</sup> | BY17 Fall         | BY18 Late-Fall   | BY18 RBT      |
| 9/24/2018                                       | 7,751                               | 13.8                   | 2.6                   | 3,371 (32 – 54)   | 0 (–)                    | 62 (126 – 133)    | 62 (92 – 100)    | 31 (86)       |
| 9/25/2018                                       | 7,814                               | 13.8                   | 2.6                   | 7,841 (28 – 58)   | 0 (–)                    | 100 (115 – 124)   | 0 (–)            | 231 (57 – 89) |
| 9/26/2018                                       | 7,751                               | 13.7                   | 2.6                   | 8,339 (28 – 55)   | 0 (–)                    | 61 (109 – 119)    | 90 (60 – 74)     | 121 (58 – 85) |
| 9/27/2018                                       | 7,729                               | 13.3                   | 2.8                   | 8,842 (32 – 59)   | 0 (–)                    | 194 (111 – 134)   | 130 (60 – 103)   | 65 (65 – 73)  |
| 9/28/2018                                       | 7,772                               | 13.4                   | 2.3                   | 8,315 (32 – 59)   | 0 (–)                    | 114 (114 – 145)   | 227 (61 – 102)   | 57 (62 – 111) |
| 9/29/2018                                       | 7,751                               | 13.5                   | 2.1                   | 13,232 (28 – 59)  | 0 (–)                    | 31 (125)          | 124 (62 – 75)    | 31 (60)       |
| 9/30/2018                                       | 7,772                               | 13.7                   | 2.4                   | 10,041 (30 – 57)  | 0 (–)                    | 0 (–)             | 131 (61 – 70)    | 34 (83)       |
| 10/1/2018                                       | 7,751                               | 13.3                   | 2.2                   | 9,829 (31 – 61)   | 0 (–)                    | 0 (–)             | 60 (70 – 72)     | 0 (–)         |
| 10/2/2018                                       | 7,836                               | 13.1                   | 2.3                   | 9,894 (32 – 58)   | 0 (–)                    | 0 (–)             | 92 (63 – 72)     | 0 (–)         |
| 10/3/2018                                       | 7,857                               | 13.5                   | 2.2                   | 14,894 (33 – 61)  | 0 (–)                    | 63 (114 – 119)    | 250 (65 – 88)    | 95 (55 – 76)  |
| 10/4/2018                                       | 7,900                               | 12.8                   | 2.8                   | 11,151 (32 – 60)  | 0 (–)                    | 96 (120 – 135)    | 159 (63 – 112)   | 35 (66)       |
| 10/5/2018                                       | 8,090                               | 13.9                   | 68.0                  | 49,357 (30 – 62)  | 0 (–)                    | 3,434 (114 – 157) | 4,085 (63 – 113) | 167 (64 – 79) |
| 10/6/2018                                       | 8,090                               | 13.8                   | 9.3                   | 26,752 (28 – 63)  | 0 (–)                    | 758 (115 – 154)   | 1,787 (64 – 113) | 45 (74 – 88)  |
| 10/7/2018                                       | 8,027                               | 13.7                   | 3.1                   | 34,692 (30 – 63)  | 0 (–)                    | 0 (–)             | 1,428 (64 – 112) | 30 (78)       |
| <b>Biweekly Total <sup>3</sup></b>              |                                     |                        |                       | <b>216,550</b>    | <b>0</b>                 | <b>4,913</b>      | <b>8,625</b>     | <b>942</b>    |
| <i>Biweekly Lower 90% Confidence Interval</i>   |                                     |                        |                       | 171,663           | 0                        | 2,787             | 5,916            | 425           |
| <i>Biweekly Upper 90% Confidence Interval</i>   |                                     |                        |                       | 261,437           | 0                        | 7,039             | 11,334           | 1,459         |
| <b>Brood Year Total</b>                         |                                     |                        |                       | <b>353,407</b>    | <b>313,867</b>           | <b>2,178,697</b>  | <b>11,802</b>    | <b>28,584</b> |
| <i>Brood year Lower 90% Confidence Interval</i> |                                     |                        |                       | 275,968           | 164,404                  | 1,230,654         | 6,336            | 12,522        |
| <i>Brood year Upper 90% Confidence Interval</i> |                                     |                        |                       | 430,845           | 463,329                  | 3,126,739         | 17,267           | 44,647        |

<sup>1</sup> Peak daily discharge values do not account for diversions at RBDD and only represent peak flows registered at the Bend Bridge Gauging station (<http://cdec2.water.ca.gov/cgi-progs/queryFx?bnd>).

<sup>2</sup> Spring Chinook brood year total reflects subtraction of 120,440 length-at-date spring Chinook determined to be winter Chinook from genetic evaluations during the period of 10/16/2017 thru 11/18/2017.

<sup>3</sup> Biweekly totals may be greater than the sum of the daily estimates presented in this table if sampling was not conducted on each day of the biweekly period. A dash (-) denotes those dates. To estimate daily passage for days that were not sampled, we impute missed sample days with the weekly mean value of days sampled within the week.

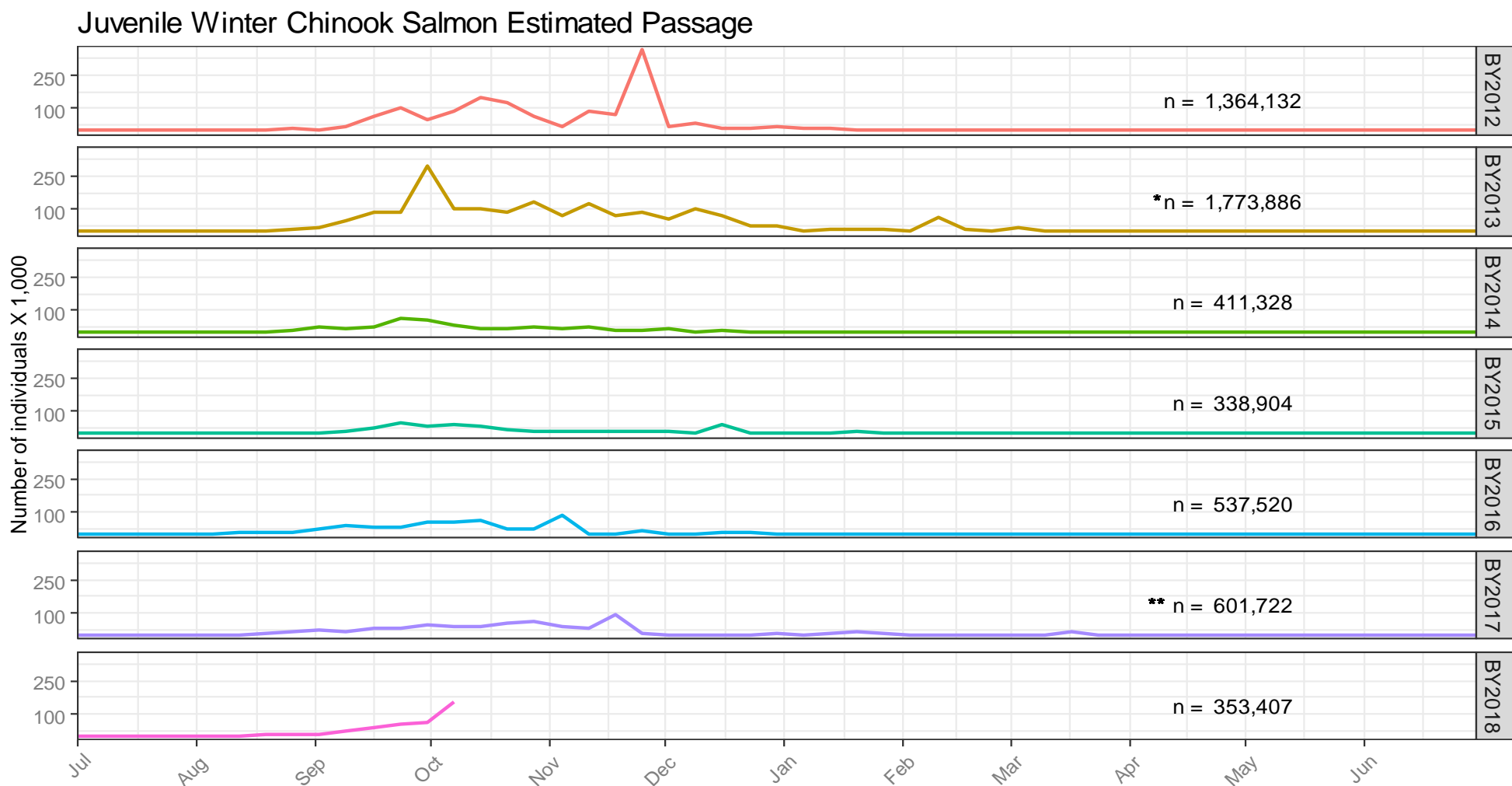


Figure 1. Weekly estimated passage of unmarked juvenile winter Chinook salmon at Red Bluff Diversion Dam (RK391) by brood-year (BY). Fish were sampled using rotary-screw traps for the period July 1, 2012 to present .

\*Winter Chinook passage value interpolated using a monthly mean for the period October 1, 2013 - October 17, 2013 due to government shutdown .

\*\*Winter Chinook passage value reflects addition of 120,440 length-at-date spring Chinook determined to be winter Chinook from genetic analysis during the period of 10/16/2017 thru 11/18/2017 .

## Juvenile Spring Chinook Salmon Estimated Passage

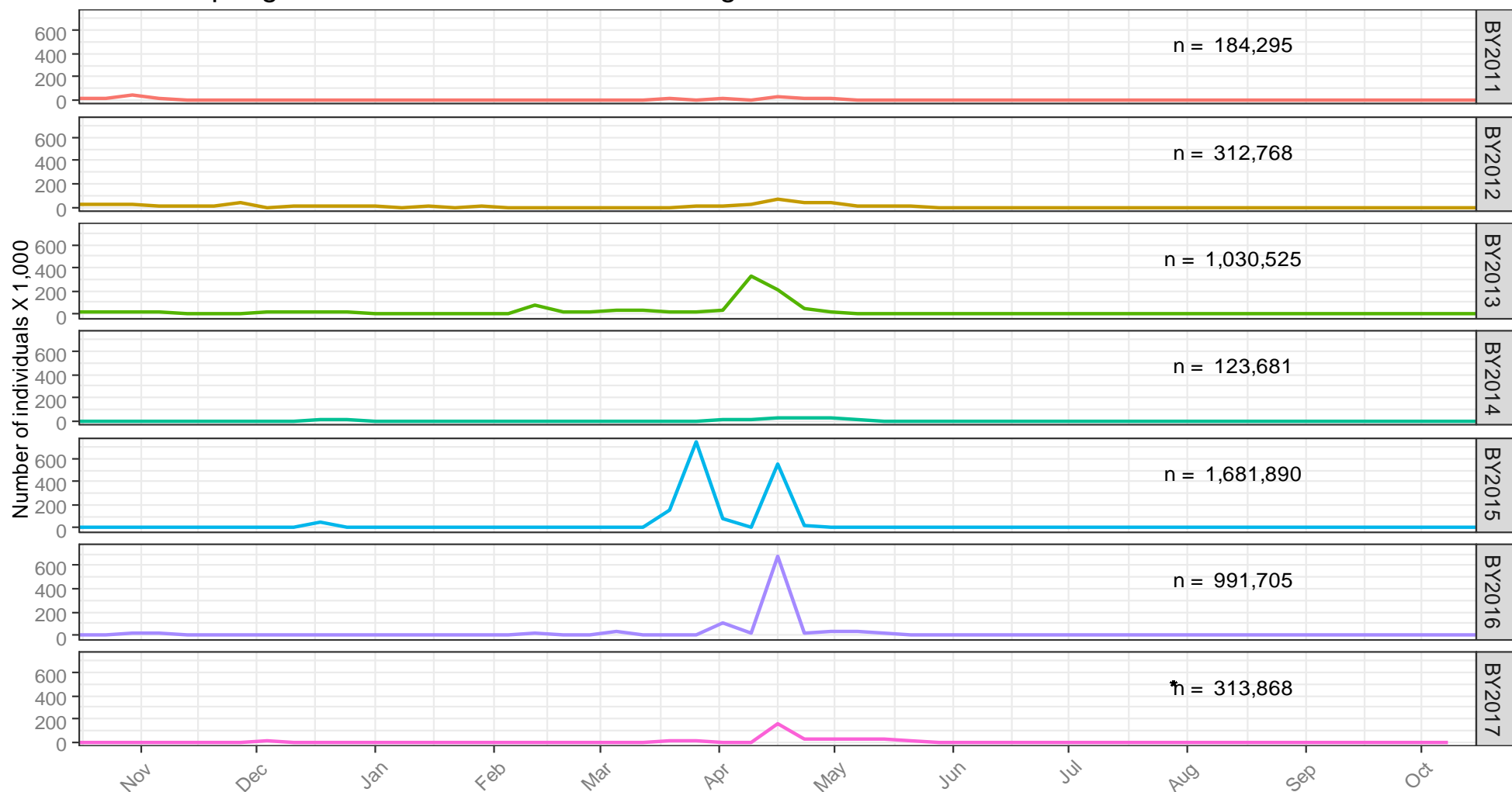


Figure 2. Weekly estimated passage of unmarked juvenile spring Chinook salmon at Red Bluff Diversion Dam (RK391) by brood-year (BY). Fish were sampled using rotary-screw traps for the period October 16, 2011 to present .

\*Spring Chinook passage value reflects subtraction of 120,440 length-at-date spring Chinook determined to be winter Chinook from genetic analysis during the period of 10/16/2017 thru 11/18/2017 .

## Juvenile *Onchorhyncus mykiss* Estimated Passage

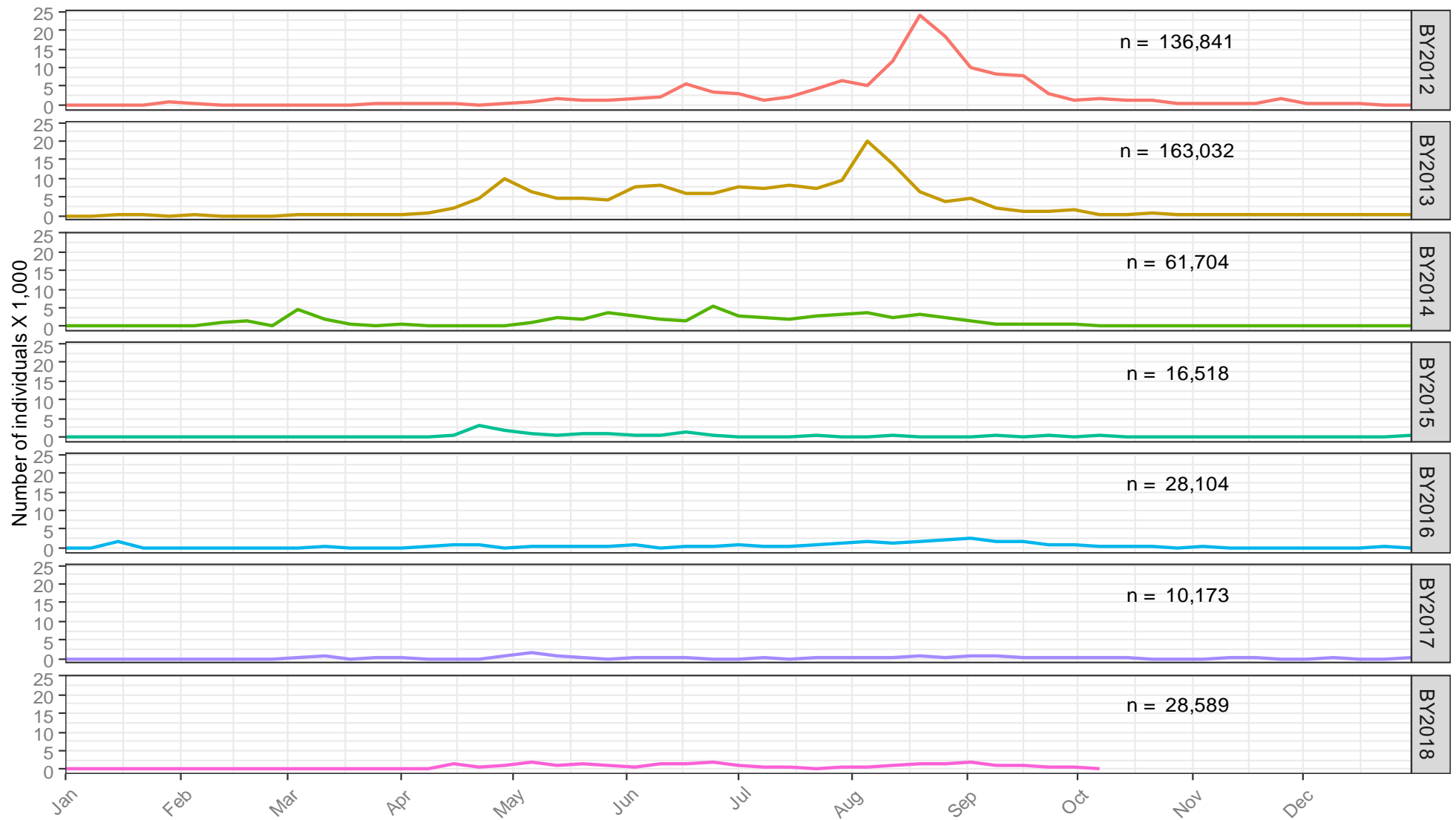


Figure 3. Weekly estimated passage of unmarked juvenile Rainbow/Steelhead trout at Red Bluff Diversion Dam (RK391) by brood-year (BY). Fish were sampled using rotary-screw traps for the period January 1, 2012 to present .

# Juvenile Fall Chinook Salmon Estimated Passage

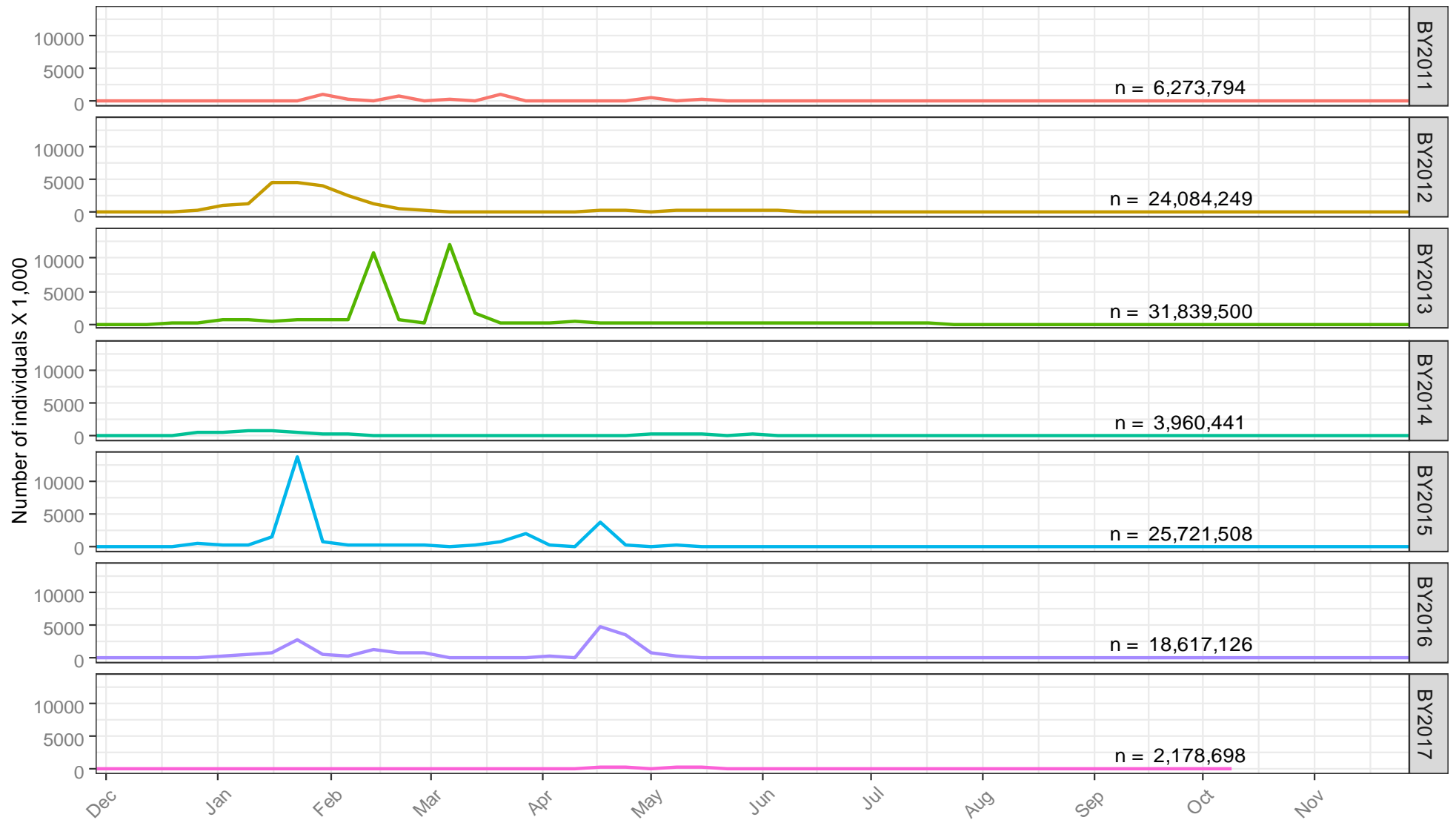


Figure 4. Weekly estimated passage of unmarked juvenile fall Chinook salmon at Red Bluff Diversion Dam (RK391) by brood-year (BY). Fish were sampled using rotary-screw traps for the period December 1, 2011 to present .

## Juvenile Late Fall Chinook Salmon Estimated Passage

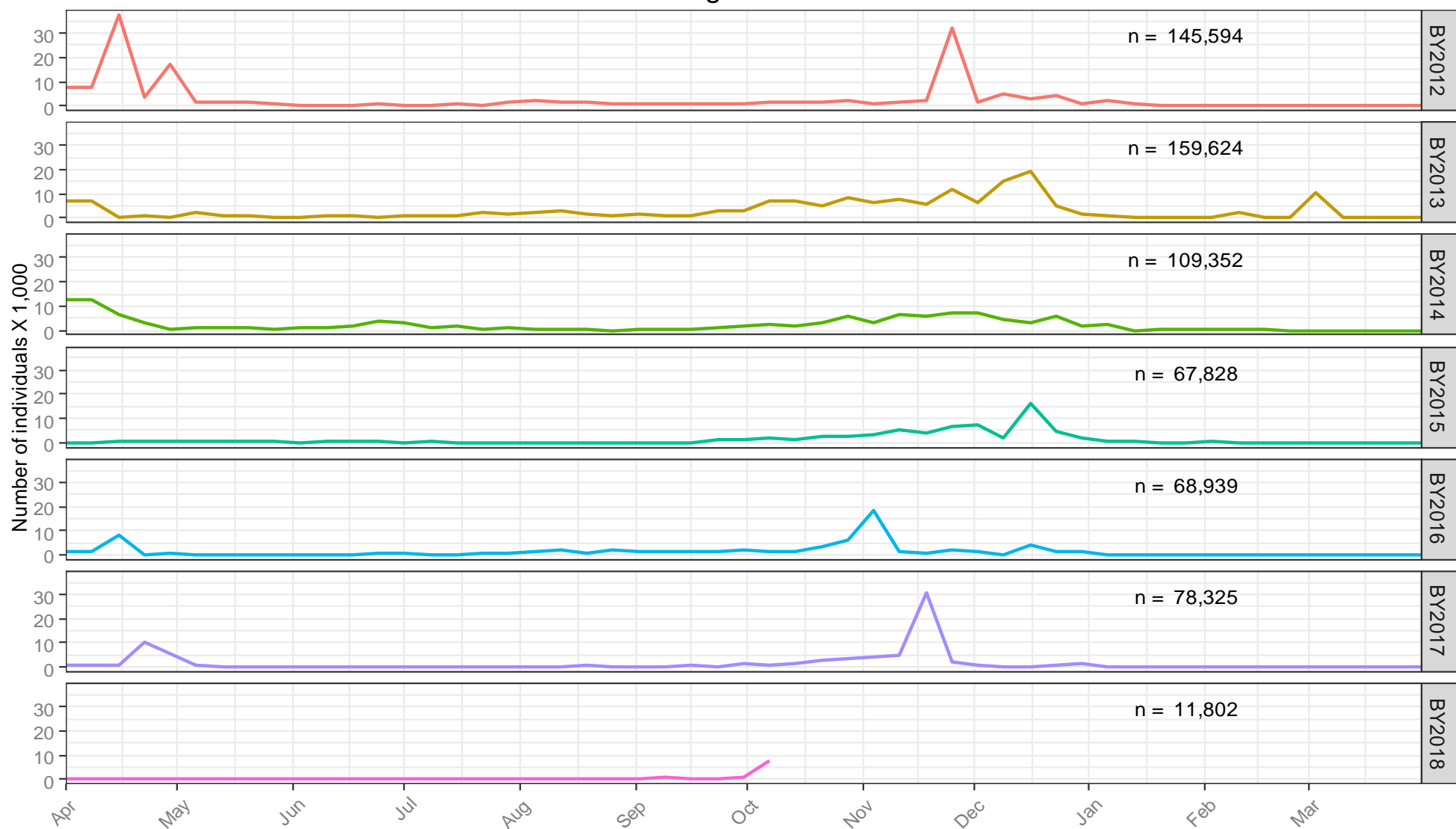


Figure 5. Weekly estimated passage of unmarked juvenile late fall Chinook salmon at Red Bluff Diversion Dam (RK391) by brood-year (BY). Fish were sampled using rotary-screw traps for the period April 1, 2012 to present .

## Weekly Estimated Chinook Passage at Red Bluff Diversion Dam - All Runs Combined

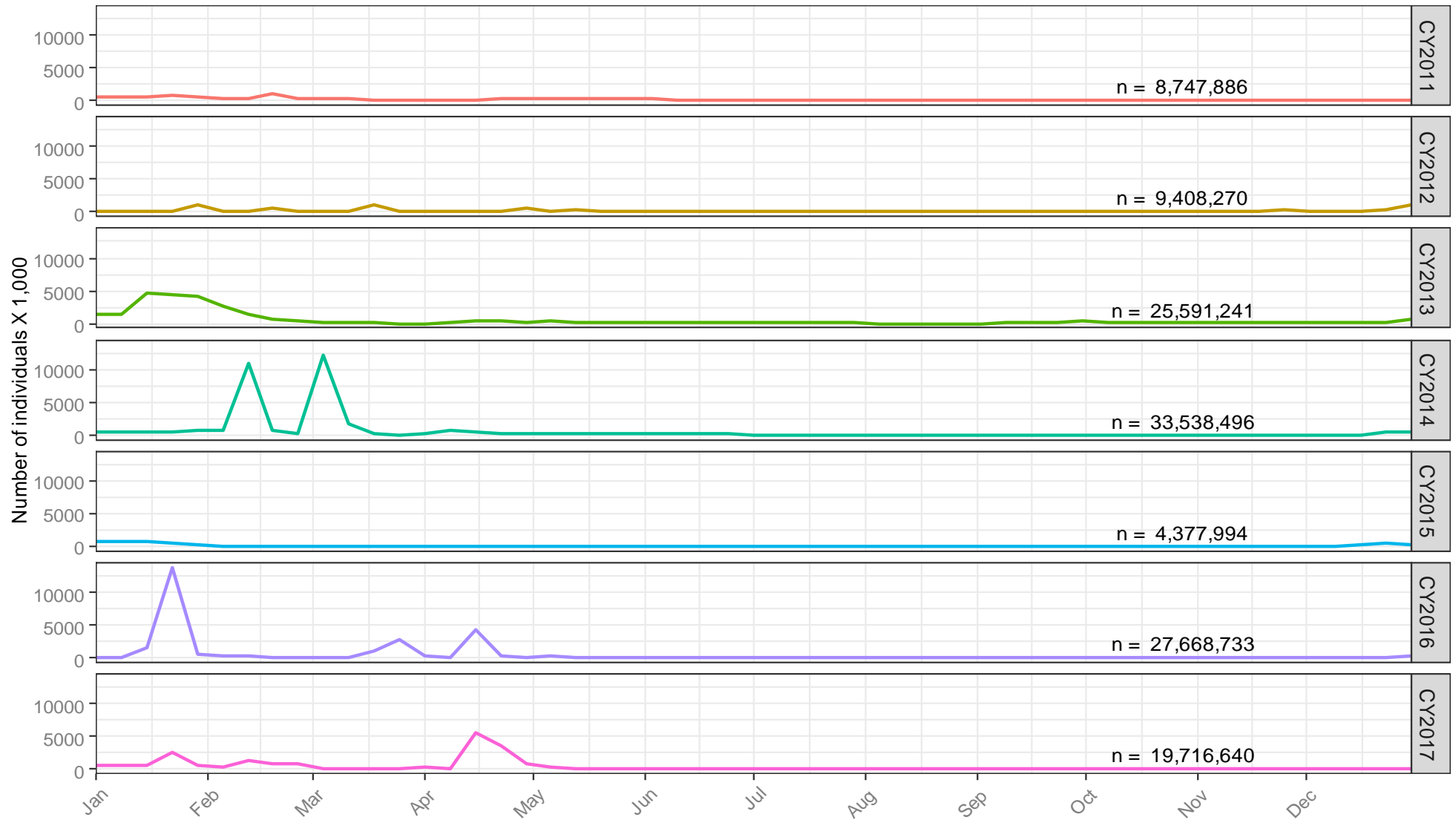


Figure 6. Weekly estimated passage of unmarked juvenile Chinook salmon at Red Bluff Diversion Dam (RK391) by calendar year. Fish were sampled using rotary-screw traps for the period January 1, 2011 to December 31, 2017